

**Notice of Allowability**

Application No.

10/676,671

Examiner

Krishnan S. Menon

Applicant(s)

GOLDSMITH ET AL.

Art Unit

1723

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment of 4/14/07.
2. ☒ The allowed claim(s) is/are 2-4 and 6-12; RENUMBERED 1-10.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

Krishnan S Menon  
Primary Examiner  
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### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Brian Dingman on 5/8/07.

The application has been amended as follows:

Claims were amended; an amended claims list flows on a fresh page below.

***Amended Claims List***

1. (canceled)
2. (currently amended) The device of claim 647 in which the membrane support is a single monolith.
3. (currently amended) The device of claim 647 in which the membrane support is a plurality of monolith segments.
4. (currently amended) The device of claim 647 in which the permselective membrane is a membrane with a mean pore size in the range of 10 nanometers to 1 micron and is suitable for an ultrafiltration or microfiltration process.
5. (canceled)
6. (previously presented) A crossflow membrane device for receiving a feedstock and for separating the feedstock into permeate and retentate, comprising:
  - a) a membrane element that receives the feedstock at a feed end face, and separates the feedstock into permeate and retentate, the membrane element comprising:
    - i) a membrane support containing at least one monolith of porous material defining a plurality of passageways with passageway wall surfaces, the passageways extending longitudinally from the feed end face of the monolith to a retentate end face of the monolith;
    - ii) a permselective membrane coating applied to the passageway wall surfaces of at least the channels through which the feedstock flows; and

iii) at least one permeate conduit formed within the monolith, the conduit containing a plurality of longitudinal permeate chambers extending substantially the entire length of the monolith, transected proximate the feed end face by at least one permeate channel and proximate the retentate end face by at least one other permeate channel;

b) a housing assembly that contains the membrane element, the assembly comprising:

i) a housing that contains the element and is spaced from the element to define an annular space between the element and the housing;

ii) a feedstock inlet port in communication with the feed end face of the monolith, and a retentate outlet port in communication with the retentate end face of the monolith;

iii) a permeate circulation inlet port in fluid communication with the permeate channel or channels through the annular space proximate the feed end face, to allow for the introduction of circulated permeate into the permeate chambers and flow of substantially all of the circulated permeate along the length of the permeate chambers;

iv) a permeate outlet port in fluid communication with the permeate channel or channels through the annular space proximate the retentate end face, to allow for the withdrawal of the permeate from the permeate chambers;

v) a means of separating the permeate flow from the feed and retentate flows; and

vi) where at least one of the permeate channels communicates with the annular space between the membrane device and the housing, in which the annular space is filled with a flow resistance material to reduce permeate flow through the annular space from the feed end of the device to the retentate end of the device.

7. (original) The device of claim 6 in which the flow resistance material is a constrained bed of granular material selected from the group of ceramic, glass, metallic or polymeric granular materials.

8. (original) The device of claim 6 in which the flow resistance material is a metal or plastic mesh.

9. (currently amended) The device of claim ~~6~~47 in which at least one permeate port communicates with a duct at an end face of the membrane element.

10. (currently amended) The devices of claim ~~6~~47 in which the cross-sectional area of the permeate chambers is reduced from the cross-sectional area of the chambers that would otherwise exist for a monolith support with a uniform and unmodified passageway structure.

11. (original) The devices of claim 10 in which the chamber cross-sectional area is reduced during the monolith support fabrication process.

12. (original) The devices of claim 10 in which the chamber cross-sectional area is reduced by plugging chambers of the monolith support during the device fabrication process.

13-18. (canceled)

***Allowable Subject Matter***

Claims 2-4 and 6-12 are allowed.

The following is an examiner's statement of reasons for allowance:

The closest references, Goldsmith and Rajnik do not teach a flow resistance material filling the annular space between the membrane device and the housing. Even if Goldsmith teaches a filling material as support in the permeate conduits within the membrane device, there is no teaching or suggestion to extend this packing to the annular space between the membrane device and the housing. Holm (US 4,906,362) teaches having beads or other filler material in the entire permeate space to control the trans-membrane pressure in a co-current permeate recycle system, which also differs from the claimed invention. The filling material being only in the annular space in the claims provide flow resistance in the annular space so that the permeate recycle stream flows through the permeate chambers.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Krishnan S Menon  
Primary Examiner  
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